Comparison of VIC 20 with TI 99/4A and Atari 400

Second draft, 8/20/82

Prices to Expand Computer:

Item	VIC 20	TI 99/4A	Atari 400
BASIC	incl	incl	81.85
Recorder	74.95	75 est.	99.95
Recorder cable	incl	15	incl
Disk drive	399	499.95	599 *
Disk controller	incl	299.95	incl
Modem	109.95	224.95	199.95
Modem interface	incl	224.95	219.95
16K RAM	109.95	incl	incl.
Total	$693.85	$1339.80	$1200.70

* Atari's disk won't work on the 400 because of limited RAM.

Features:

Feature	VIC 20	TI 99/4A	Atari 400
Keyboard:			
Typewriter keys	YES	YES	no
Typewriter feel	YES	no	no
Color control keys	YES	no	no
Graphics on keys	YES	no	no
Reverse letters	YES	no	YES
Programmable function keys	YES	no	no
Works with TV or monitor	YES	YES	no
True lower case	YES	no	YES
BASIC language:			
Extended BASIC	YES	extra	extra
String Arrays	YES	no	no
Integer variables	YES	no	YES
Unlimited array dimensions	YES	no (3)	no (2)
English error messages	YES	YES	no
Real-time clock	YES	no	no
Cassette deck:			
Named programs & files	YES	no	no
Digital circuitry	YES	no	YES
Disk Drive:			
Capacity in K-bytes	174	90	88
Computer RAM not used	YES	no	no
Modem:			
Direct-connect	YES	no	no
Software	YES	extra	extra

Despite VIC's lower expansion price (Atari is 73% higher, TI 93% higher), the system shown above will significantly out-perform the competitors.

The VIC disk drive has a capacity of over 174 K bytes, compared to Atari at 88K and TI at 90K. VIC's disk requires no RAM from the computer, while TI and Atari use significant amounts of memory. This is because we use an intelligent controller, which has its own 6502 microprocessor, RAM, and ROM, which also increases the speed of throughput.

VIC's modem includes all software necessary to run. It directly connects to the phone line, eliminating interference from room noise. The competition uses acoustic couplers which are sensitive to noise.

VIC's printer is an 80 column tractor-feed dot-matrix impact printer. TI's model is a thermal printer, using specially roll treated paper, and the model is being dropped in favor of a $750 impact printer. Atari's printer is 40 columns and looks like an adding machine, also using roll paper.

VIC's BASIC is a full expanded MicroSoft version. Both TI and Atari sell optional versions of an extended BASIC which is equivalent to that already included in the VIC. VIC's BASIC is faster in operation and more flexible than other systems.

BASIC comparison:

VIC BASIC allows integer, floating point, and string variables, along with arrays with any number of dimensions for any type of variable. TI has no integer variables, no string or integer arrays, and a maximum of 3 dimensions for arrays. Atari does not allow string arrays.

VIC and Atari BASIC's IF...THEN statement can be followed by either a line number (IF...GOTO...) or any list of BASIC statements. TI's IF statement only allows line numbers.

TI BASIC only permits 1 statement per line, while VIC and Atari permit multiple statements in each line.

Atari error messages are numbers only, while VIC and TI use English messages. Atari's prompts for cassette load and save are beeps, while VIC and TI use English ("beep" on Atari = "Press PLAY on tape" on VIC; "beep-beep" on Atari = "Press RECORD and PLAY on tape" on VIC).

VIC and Atari include a "warm-start" key to get out of an error situation without destroying the contents of RAM. TI only includes a "cold-start" which erases everything in RAM.

VIC allows naming the programs and data files on tape. TI and Atari do not. VIC and Atari use special recorders for easy use of cassettes with the computer, while TI uses unreliable standard audio recorders.

TI BASIC requires use of spaces within lines, while VIC and Atari do not.

TI allows no access to machine language without optional cartridges, while VIC and Atari have machine-language access built-in.

VIC includes a built-in real-time clock, with hours, minutes, seconds, and sixtieths of a second. Atari and TI do not.

TI BASIC does not include these commands or their equivalents: PEEK, POKE, SYS, USR, SPC, FRE, and WAIT.

The speed of execution of the VIC's BASIC is considerably faster than the competition. A sample program will run at least 5 times slower on TI, for example. Here is a simple BASIC program that will run on any machine to test the speed:

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10 FOR L=1 TO 100
20 PRINT L
30 NEXT L
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Technical Comparison:

VIC and Atari use the 6502 microprocessor, developed by the MOS Technology subsidiary of Commodore. This advanced 8-bit processor uses a sophisticated architecture called "pipelining", in which each new command is loaded while the current command is executed. This pipeline system is used in bigger processors such as IBM's 370.

TI uses its own older 9900 chip, a 16-bit microprocessor without the pipeline architecture. Therefore, it performs commands at approximately the same rate as the 6502, even though its data path is larger.

VIC and Atari have the capacity to attach to paddle controllers and light pens, which TI does not. VIC's light pen is expected to sell for under $30, compared to Atari's $79.95 pen that was recalled for engineering defects (it couldn't detect dark colors).

VIC is more memory efficient than the competitors. VIC's peripherals use no RAM from the VIC, while Atari's disk uses over 10K and TI's uses over 256 bytes. VIC BASIC stores all keywords (commands, statements, etc.) in 1 byte "tokenized" form, while the competitors take 1 byte for each letter in the keyword. Thus, the command RESTORE takes 1 byte on the VIC but takes 7 on the competition.

Atari's 16K RAM is not expandable, at least not with parts approved by Atari and not by non-technical people. TI's 16K RAM can be expanded by 32K for a cost of $400, but the extra RAM is not available to the user or for BASIC without extra cartridges, such as the $99.95 Mini Memory. VIC's 5K RAM can be expanded by 3K, 8K, or 16K RAM by plugging in cartridges, and all RAM is available for BASIC programs.

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